* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]Have the following, and said sliding valve 16 has the 1st channel in a valve element, and is provided with the orifice 18 in this channel, Establish the 1st port 19 in the upstream of this orifice, and the 2nd port 20 is established in the downstream, While resisting energizing force of said return spring 21, moving the sliding valve 16 according to a hydrostatic pressure difference produced before and after said orifice 18 and opening the 1st channel for free passage to an output port via said 1st port 19, the 2nd port 20 and a discharge port -- a multi port change-over valve constituting so that a free passage may be intercepted.
The output port 13 (14).
The cylinder body 11 which has the discharge port 15.
The sliding valve 16 which is arranged in this cylinder body, enabling free sliding, and can open and close said each port.
The return spring 21 which energizes said sliding valve to an initial state.

[Claim 2]Form the electromagnetic valve 2 which opens a channel of the upstream of said orifice for free passage and is intercepted, and a hydrostatic pressure difference is generated before and after said orifice 18 by hydrostatic pressure from a fluid pressure source by opening said electromagnetic valve, While resisting energizing force of said return spring 21, moving the sliding valve 16 according to this fluid pressure difference and opening said 1st channel for free passage to an output port via the 1st port 19, The multi port change-over valve according to claim 1 constituting so that a free passage with the 2nd port 20 and the discharge port 15 may be intercepted.
[Claim 3]When two or more said output ports are formed in the cylinder side and a sliding valve is located in an initial state, When each output port is opened for free passage by the 2nd channel formed in the sliding valve side and a sliding valve moves, while a free passage of each output port is intercepted, The multi port change-over valve according to claim 1 or 2 constituting at least one output port so that it may be open for free passage via the 1st channel and said 1st port in the sliding valve side.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to a multi port change-over valve.
It is related with the made multi port change-over valve which can open and close two or more ports simultaneously according to the hydrostatic pressure difference generated more particularly before and after the orifice provided in the multi port change-over valve.

[0002]
[Description of the Prior Art]Conventionally, as a multi port change-over valve, what is indicated to Utility Model Gazette No. 2517771 is known well, for example. The valve body of the internal hollow where this change-over valve is attached in one with a solenoid and this solenoid, The spool inserted into this valve body enabling free sliding, and the rod by which one end is connected with the plunger which functions as a moving core in said solenoid, the other end projects inside a valve body, and operation connection is carried out at a spool, In ********, to said valve body, the 1st port by the side of a fluid supplying source, and the 2nd port by the side of a control section, While providing the 3rd port for discharging the return fluid from a control section, and the 4th port for discharging the stagnation fluid in said solenoid, In the electromagnetic valve linked to the channel established in the attachment mating member which inserts said valve body in the fitting part inner circumference of an attachment mating member, and carries out the opening of said 1st [the] thru/or the 4th port corresponding to each port, While locating said 4th port between a spool and a solenoid, the communicating path for opening said 4th port and the 3rd port for free passage on said valve body periphery is provided, and it is characterized by unifying the discharge flow path of the attachment other party to one.
[0003]
[Problem(s) to be Solved by the Invention]However, the spool inserted into a valve body in the above-mentioned device enabling free sliding, Since it has composition which is connected with the plunger which functions as a moving core in a solenoid via a rod, moves a spool via the plunger as a moving core, and switches a channel, It is necessary to take the long stroke of the plunger which operates a spool, and the overall length of a change-over valve becomes long. In order to take a long stroke, so much, a thrust also becomes large, and a solenoid enlarges it and it has problems, like power consumption also becomes large.
[0004]Then, the purpose of this invention is as follows.
A channel is formed in the sliding valve which constitutes a multi port change-over valve, and an orifice is provided in this channel, and operate a sliding valve according to the hydrostatic pressure difference before and behind an orifice.
As arrange the electromagnetic valve as a general 2 position change-over valve in a channel as a means to generate a hydrostatic pressure difference before and after said orifice, open this

electromagnetic valve, you let the pressure fluid from a fluid pressure source act on an orifice and you switch the port of a multi port change-over valve, solve the above-mentioned problem.

[0005]Since this invention is the composition of operating a sliding valve using the hydrostatic pressure difference generated before and after the orifice provided in the channel, it becomes unnecessary to incorporate an electromagnetic valve in a multi port change-over valve, the composition of a multi port change-over valve is simplified, and it can realize the small weight saving of the whole valve further. As a means to generate a hydrostatic pressure difference before and after the orifice in a multi port change-over valve, Since the common electromagnetic valve in the channel connected to a multi port change-over valve is formed, this electromagnetic valve is opened and closed, supply interception of the fluid to a multi port change-over valve is performed and a hydrostatic pressure difference is generated before and after an orifice, the thing of composition special as an electromagnetic valve for a valve change becomes unnecessary, and large cost reduction can be planned.

[0006]

[Means for Solving the Problem]For this reason, a technical solving means which this invention adopted, A cylinder body which has an output port and a discharge port, and a sliding valve which are arranged in this cylinder body, enabling free sliding, and can open and close said each port, Have a return spring which energizes said sliding valve to an initial state, and said sliding valve, Have the 1st channel in a valve element, have an orifice in this channel, and to the upstream of this orifice the 1st port, While establishing the 2nd port in the downstream, resisting energizing force of said return spring, moving a sliding valve according to a hydrostatic pressure difference produced before and after said orifice and opening the 1st channel for free passage to an output port via said 1st port, It is a multi port change-over valve constituting so that a free passage with the 2nd port and a discharge port may be intercepted.

[0007]

[Embodiment of the Invention]Hereafter, when an embodiment of the invention is described based on a drawing, drawing 1 is the lineblock diagram of one example which incorporated the multi port change-over valve in connection with this embodiment in the hydraulic system, the non operating state is shown and drawing 2 is a lineblock diagram of the operating state of the multi port valve. In drawing 1, the multi port change-over valve concerning this embodiment in 1, and 2, an electromagnetic valve and 3, the accumulator as a source of fluid pressure and 4 are reservoirs, and, as for a fluid pump and 5, one hydraulic circuit is constituted by these. The above-mentioned circuit is an example and, as for the circuit which can use the multi port change-over valve concerning this invention, it is natural that it can use for various things, such as a general hydraulic circuit, a brake system, etc.

[0008]The multi port change-over valve 1 is provided with the following.

The cylinder 12 formed in the main part 11.

The 1st output port 13, the 2nd output port 14, the discharge port 15 which are open for free passage in this cylinder 12.

the 1st output port 13 and the 2nd output port 14 being formed as a position which is mutually opened for free passage by the slot 17 as the 2nd channel formed in the sliding valve 16 mentioned later, when a multi port change-over valve is in a non operating state (at the time of the state which shows in drawing 1), and, The discharge port 15 is formed in the position used as the 2nd port 20 formed in the sliding valve 16 mentioned later, and a communicating state when a multi port change-over valve is in a non operating state (at the time of the state which shows in drawing 1).

[0009]The sliding valve 16 is arranged in the cylinder 12 in a main part, enabling free sliding, the 1st channel 22 is formed in the central part, and, as for this sliding valve 16, the orifice 18 is formed in this 1st channel 22. In the channel 22 of the upstream of the orifice 18, it is open for free passage in this channel, and the 1st port 19 is formed, and in the channel 22a of the downstream of an orifice,

it is open for free passage in this channel, the 2nd port 20 is formed, and the slot 17 as the 2nd channel mentioned above is further formed in the periphery of the sliding valve 16.
[0010]In the initial position which the sliding valve 16 is energized with the return spring 21 by the left in a figure, and is shown in drawing 1. The 1st output port 13 formed in the main part 11 and the 2nd output port 14 are a communicating state by the slot 17 formed in the periphery of the sliding valve 16, and, in the 1st output port 13 and the 2nd output port 14, the 1st channel 22 of the sliding valve 16 has become a cut off state. The discharge port 15 formed in the main part 11 side is the 2nd port 20 and communicating state which were formed in the sliding valve 16. The electromagnetic valve 2 in a hydraulic circuit is constituted as A and a B-2 position change-over valve, at the time of un-operating, takes A position and is intercepting the channel. If the sensor which does not illustrate what the hydrostatic pressure of the accumulator 3 decompressed detects, the fluid pump 4 can operate automatically and can pressurize the accumulator 3.
[0011]Next, the operation of the multi port change-over valve which consists of the above composition is explained. Since the electromagnetic valve 2 makes the channel the cut off state in the non operating state shown in drawing 1, the hydrostatic pressure difference has not been generated in around 18 orifices in the multi port change-over valve 1. At this time, the 1st output port 13 and the 2nd output port 14 are a communicating state by the slot 17 formed in the periphery of the sliding valve 16, for example, permit the flow of the fluid the 1st output port 13 -> 2nd output port 14 or, and in that hydraulic circuit it is reverse and is not illustrated.
[0012]By the instructions from the electronic control which is not illustrated, if an electromagnetic valve changes to B position, the pressure fluid from the accumulator 3 will flow into the multi port change-over valve 1, and will generate a hydrostatic pressure difference before and after the orifice 18 in the sliding valve 16. If this hydrostatic pressure difference becomes larger than the energizing force of a return spring, the sliding valve 16 will move to the drawing 2 state, will open the 1st port 19 and the 1st output port 13 of a sliding valve for free passage, and will supply the pressure fluid from an accumulator to the 1st port 19 -> output port 13.
[0013]With movement of the sliding valve 16, the 2nd output port 14 and the 1st output port 13 by the side of the main part 11 are intercepted, and the discharge port 15 and the 2nd port by the side of the sliding valve 16 are also intercepted. In the Honda port change-over valve, a sliding valve will move to the longitudinal direction in a figure according to the hydrostatic pressure generated before and after an orifice, and the energizing force of a return spring, and the hydrostatic pressure supplied to the 1st output port 13 always turns into more than constant pressure from the 1st channel 22. In this way, a multi port change-over valve can be switched by switching the electromagnetic valve 2 only by generating a hydrostatic pressure difference before and after an orifice using the hydrostatic pressure from the accumulator 3.
[0014]A 2nd and 3rd embodiment of the multi port change-over valve concerning this invention is described continuously. Drawing 3 is the example made into one output port formed in the main part side of a multi port change-over valve, and drawing 4 considers it as three output ports formed in the main part side, and is an example. When any example switches an electromagnetic valve, before and after an orifice, a hydrostatic pressure difference can be generated, a channel can be switched now, and composition can be substantially simplified rather than a solenoid like before, and an integral-type change-over valve.
[0015]In the above-mentioned example, although the return spring is using the compression spring, it can change the position of a spring and can use a **** spring. The multi port change-over valve of various gestalten can be constituted by changing the position of the slot formed in a sliding valve, or the position of the output port formed in the main part side. The multi port change-over valve concerning this invention can be used in various hydraulic circuits, and use in alignment with each purpose is possible for it. The pressure fluid directly breathed out from a pump as a fluid pressure source can also be used. It cannot be overemphasized that a multi port change-over valve can be used for any hydraulic circuit of a fluid and a gas. Furthermore, this invention can be carried out in

other various forms, without deviating from the pneuma or main features. Therefore, at all points, the above-mentioned embodiment is only mere illustration, and must not be interpreted restrictively.

[0016]
[Effect of the Invention]Since it is the composition of operating a sliding valve using the hydrostatic pressure difference generated before and after the orifice provided in the multi port change-over valve according to this invention as stated to details above, It becomes unnecessary to incorporate an electromagnetic valve in a multi port change-over valve, the composition of a multi port change-over valve is simplified, and the small weight saving of the whole valve can be realized further. Only by forming the common electromagnetic valve in the channel connected to a multi port change-over valve, opening and closing this electromagnetic valve, and making a pressure fluid act on the orifice in a multi port change-over valve, Since the change of the port of a multi port change-over valve can be performed, the electromagnetic valve of the special composition for a valve change like before becomes unnecessary, Moreover it can plan large cost reduction, a thing small as an electromagnetic valve can be used and the effect which was excellent in the ability to also press down power consumption can be done so.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention]This invention relates to a multi port change-over valve.
It is related with the made multi port change-over valve which can open and close two or more ports simultaneously according to the hydrostatic pressure difference generated more particularly before and after the orifice provided in the multi port change-over valve.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art]Conventionally, as a multi port change-over valve, what is indicated to Utility Model Gazette No. 2517771 is known well, for example. The valve body of the internal hollow where this change-over valve is attached in one with a solenoid and this solenoid, The spool inserted into this valve body enabling free sliding, and the rod by which one end is connected with the plunger which functions as a moving core in said solenoid, the other end projects inside a valve body, and operation connection is carried out at a spool, In ********, to said valve body, the 1st port by the side of a fluid supplying source, and the 2nd port by the side of a control section, While providing the 3rd port for discharging the return fluid from a control section, and the 4th port for discharging the stagnation fluid in said solenoid, In the electromagnetic valve linked to the channel established in the attachment mating member which inserts said valve body in the fitting part inner circumference of an attachment mating member, and carries out the opening of said 1st [the] thru/or the 4th port corresponding to each port, While locating said 4th port between a spool and a solenoid, the communicating path for opening said 4th port and the 3rd port for free passage on said valve body periphery is provided, and it is characterized by unifying the discharge flow path of the attachment other party to one.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention]Since it is the composition of operating a sliding valve using the hydrostatic pressure difference generated before and after the orifice provided in the multi port change-over valve according to this invention as stated to details above, It becomes unnecessary to incorporate an electromagnetic valve in a multi port change-over valve, the composition of a multi port change-over valve is simplified, and the small weight saving of the whole valve can be realized further. Only by forming the common electromagnetic valve in the channel connected to a multi port change-over valve, opening and closing this electromagnetic valve, and making a pressure fluid act on the orifice in a multi port change-over valve, Since the change of the port of a multi port change-over valve can be performed, the electromagnetic valve of the special composition for a valve change like before becomes unnecessary, Moreover it can plan large cost reduction, a thing small as an electromagnetic valve can be used and the effect which was excellent in the ability to also press down power consumption can be done so.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, the spool inserted into a valve body in the above-mentioned device enabling free sliding, Since it has composition which is connected with the plunger which functions as a moving core in a solenoid via a rod, moves a spool via the plunger as a moving core, and switches a channel, It is necessary to take the long stroke of the plunger which operates a spool, and the overall length of a change-over valve becomes long. In order to take a long stroke, so much, a thrust also becomes large, and a solenoid enlarges it and it has problems, like power consumption also becomes large.
[0004]Then, the purpose of this invention is as follows.
A channel is formed in the sliding valve which constitutes a multi port change-over valve, and an orifice is provided in this channel, and operate a sliding valve according to the hydrostatic pressure difference before and behind an orifice.
As arrange the electromagnetic valve as a general 2 position change-over valve in a channel as a means to generate a hydrostatic pressure difference before and after said orifice, open this electromagnetic valve, you let the pressure fluid from a fluid pressure source act on an orifice and you switch the port of a multi port change-over valve, solve the above-mentioned problem.

[0005]Since this invention is the composition of operating a sliding valve using the hydrostatic pressure difference generated before and after the orifice provided in the channel, it becomes unnecessary to incorporate an electromagnetic valve in a multi port change-over valve, the composition of a multi port change-over valve is simplified, and it can realize the small weight saving of the whole valve further. As a means to generate a hydrostatic pressure difference before and after the orifice in a multi port change-over valve, Since the common electromagnetic valve in the channel connected to a multi port change-over valve is formed, this electromagnetic valve is opened and closed, supply interception of the fluid to a multi port change-over valve is performed and a hydrostatic pressure difference is generated before and after an orifice, the thing of composition special as an electromagnetic valve for a valve change becomes unnecessary, and large cost reduction can be planned.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem]For this reason, a technical solving means which this invention adopted, A cylinder body which has an output port and a discharge port, and a sliding valve which are arranged in this cylinder body, enabling free sliding, and can open and close said each port, Have a return spring which energizes said sliding valve to an initial state, and said sliding valve, Have the 1st channel in a valve element, have an orifice in this channel, and to the upstream of this orifice the 1st port, While establishing the 2nd port in the downstream, resisting energizing force of said return spring, moving a sliding valve according to a hydrostatic pressure difference produced before and after said orifice and opening the 1st channel for free passage to an output port via said 1st port, It is a multi port change-over valve constituting so that a free passage with the 2nd port and a discharge port may be intercepted.
[0007]
[Embodiment of the Invention]Hereafter, when an embodiment of the invention is described based on a drawing, drawing 1 is the lineblock diagram of one example which incorporated the multi port change-over valve in connection with this embodiment in the hydraulic system, the non operating state is shown and drawing 2 is a lineblock diagram of the operating state of the multi port valve. In drawing 1, the multi port change-over valve concerning this embodiment in 1, and 2, an electromagnetic valve and 3, the accumulator as a source of fluid pressure and 4 are reservoirs, and, as for a fluid pump and 5, one hydraulic circuit is constituted by these. The above-mentioned circuit is an example and, as for the circuit which can use the multi port change-over valve concerning this invention, it is natural that it can use for various things, such as a general hydraulic circuit, a brake system, etc.
[0008]The multi port change-over valve 1 is provided with the following.
The cylinder 12 formed in the main part 11.
The 1st output port 13, the 2nd output port 14, the discharge port 15 which are open for free passage in this cylinder 12.
the 1st output port 13 and the 2nd output port 14 being formed as a position which is mutually opened for free passage by the slot 17 as the 2nd channel formed in the sliding valve 16 mentioned later, when a multi port change-over valve is in a non operating state (at the time of the state which shows in drawing 1), and, The discharge port 15 is formed in the position used as the 2nd port 20 formed in the sliding valve 16 mentioned later, and a communicating state when a multi port change-over valve is in a non operating state (at the time of the state which shows in drawing 1).
[0009]The sliding valve 16 is arranged in the cylinder 12 in a main part, enabling free sliding, the 1st channel 22 is formed in the central part, and, as for this sliding valve 16, the orifice 18 is formed in this 1st channel 22. In the channel 22 of the upstream of the orifice 18, it is open for free passage in this channel, and the 1st port 19 is formed, and in the channel 22a of the downstream of an orifice, it is open for free passage in this channel, the 2nd port 20 is formed, and the slot 17 as the 2nd channel mentioned above is further formed in the periphery of the sliding valve 16.

[0010]In the initial position which the sliding valve 16 is energized with the return spring 21 by the left in a figure, and is shown in drawing 1. The 1st output port 13 formed in the main part 11 and the 2nd output port 14 are a communicating state by the slot 17 formed in the periphery of the sliding valve 16, and, in the 1st output port 13 and the 2nd output port 14, the 1st channel 22 of the sliding valve 16 has become a cut off state. The discharge port 15 formed in the main part 11 side is the 2nd port 20 and communicating state which were formed in the sliding valve 16. The electromagnetic valve 2 in a hydraulic circuit is constituted as A and a B-2 position change-over valve, at the time of un-operating, takes A position and is intercepting the channel. If the sensor which does not illustrate what the hydrostatic pressure of the accumulator 3 decompressed detects, the fluid pump 4 can operate automatically and can pressurize the accumulator 3.
[0011]Next, the operation of the multi port change-over valve which consists of the above composition is explained. Since the electromagnetic valve 2 makes the channel the cut off state in the non operating state shown in drawing 1, the hydrostatic pressure difference has not been generated in around 18 orifices in the multi port change-over valve 1. At this time, the 1st output port 13 and the 2nd output port 14 are a communicating state by the slot 17 formed in the periphery of the sliding valve 16, for example, permit the flow of the fluid the 1st output port 13 -> 2nd output port 14 or, and in that hydraulic circuit it is reverse and is not illustrated.
[0012]By the instructions from the electronic control which is not illustrated, if an electromagnetic valve changes to B position, the pressure fluid from the accumulator 3 will flow into the multi port change-over valve 1, and will generate a hydrostatic pressure difference before and after the orifice 18 in the sliding valve 16. If this hydrostatic pressure difference becomes larger than the energizing force of a return spring, the sliding valve 16 will move to the drawing 2 state, will open the 1st port 19 and the 1st output port 13 of a sliding valve for free passage, and will supply the pressure fluid from an accumulator to the 1st port 19 -> output port 13.
[0013]With movement of the sliding valve 16, the 2nd output port 14 and the 1st output port 13 by the side of the main part 11 are intercepted, and the discharge port 15 and the 2nd port by the side of the sliding valve 16 are also intercepted. In the Honda port change-over valve, a sliding valve will move to the longitudinal direction in a figure according to the hydrostatic pressure generated before and after an orifice, and the energizing force of a return spring, and the hydrostatic pressure supplied to the 1st output port 13 always turns into more than constant pressure from the 1st channel 22. In this way, a multi port change-over valve can be switched by switching the electromagnetic valve 2 only by generating a hydrostatic pressure difference before and after an orifice using the hydrostatic pressure from the accumulator 3.
[0014]A 2nd and 3rd embodiment of the multi port change-over valve concerning this invention is described continuously. Drawing 3 is the example made into one output port formed in the main part side of a multi port change-over valve, and drawing 4 considers it as three output ports formed in the main part side, and is an example. When any example switches an electromagnetic valve, before and after an orifice, a hydrostatic pressure difference can be generated, a channel can be switched now, and composition can be substantially simplified rather than a solenoid like before, and an integral-type change-over valve.
[0015]In the above-mentioned example, although the return spring is using the compression spring, it can change the position of a spring and can use a **** spring. The multi port change-over valve of various gestalten can be constituted by changing the position of the slot formed in a sliding valve, or the position of the output port formed in the main part side. The multi port change-over valve concerning this invention can be used in various hydraulic circuits, and use in alignment with each purpose is possible for it. The pressure fluid directly breathed out from a pump as a fluid pressure source can also be used. It cannot be overemphasized that a multi port change-over valve can be used for any hydraulic circuit of a fluid and a gas. Furthermore, this invention can be carried out in other various forms, without deviating from the pneuma or main features. Therefore, at all points, the above-mentioned embodiment is only mere illustration, and must not be interpreted restrictively.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is the lineblock diagram of one example which incorporated the multi port change-over valve as an embodiment concerning this invention in the hydraulic system, and is a figure showing a non operating state.
[Drawing 2]It is a lineblock diagram of the operating state of the multi port valve.
[Drawing 3]It is a sectional view of the multi port change-over valve as a 2nd embodiment.
[Drawing 4]It is a sectional view of the multi port change-over valve as a 3rd embodiment.
[Description of Notations]
1 Multi port change-over valve
2 Electromagnetic valve
3 Accumulator
4 Fluid pump
5 Reservoir
11 Main part
12 Cylinder
13 The 1st output port
14 The 2nd output port
15 Discharge port
16 Sliding valve
17 Slot
18 Orifice
19 The 1st port
20 The 2nd port
21 Return spring

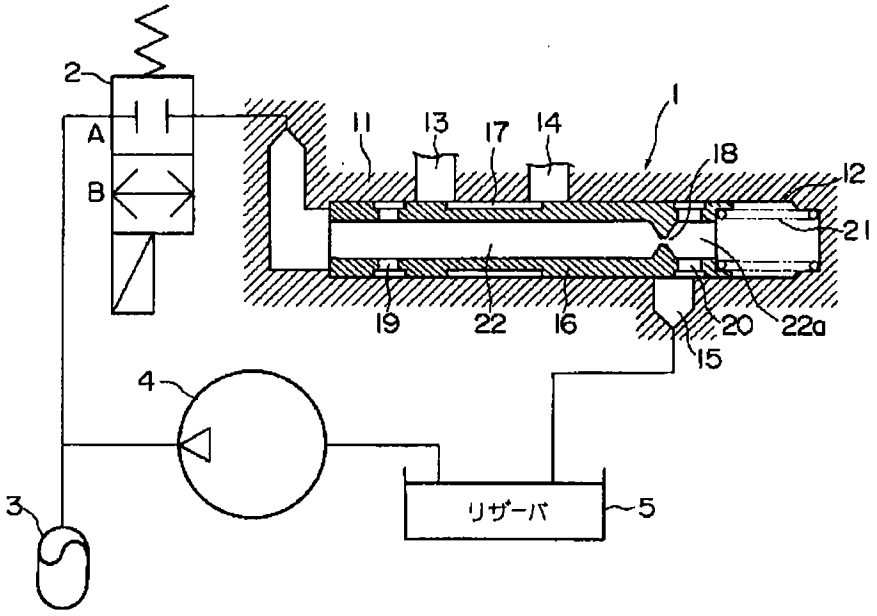
[Translation done.]

* NOTICES *

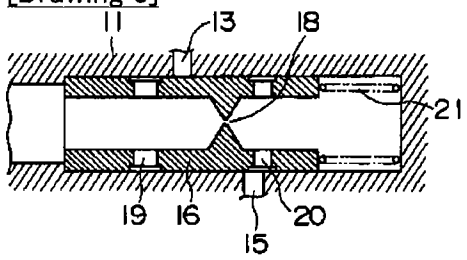
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

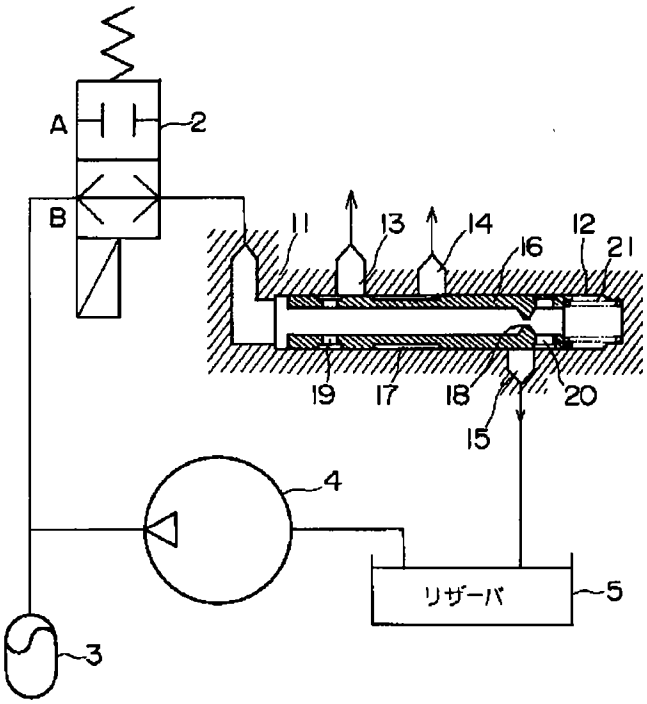
[Drawing 1]



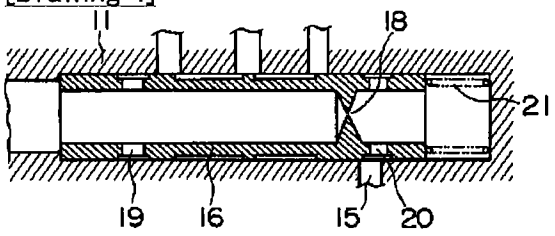
[Drawing 3]



[Drawing 2]



[Drawing 4]



[Translation done.]